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10/507,095

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Gerhard Tuymer

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NOTARO & MICHALOS P.C.  
100 DUTCH HILL ROAD  
SUITE 110  
ORANGEBURG, NY 10962-2100

EXAMINER

BAND, MICHAEL A

ART UNIT

PAPER NUMBER

1795

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                      |  |
|------------------------------|--------------------------------------|--------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/507,095 | <b>Applicant(s)</b><br>TUYMER ET AL. |  |
|                              | <b>Examiner</b><br>MICHAEL BAND      | <b>Art Unit</b><br>1795              |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/28/2008 has been entered.

### ***Information Disclosure Statement***

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Manley (US Patent No. 5,993,613) in view of Latz et al (US Patent No. 5,026,471).

With respect to claims 1 and 13-14, Manley discloses a film deposition apparatus [10] depositing a film [12] of material onto a substrate [16] by sputtering from a target/cathode assembly [20] by generating a plasma [38] with a vacuum pump [28] attached a process chamber [18] (abstract; fig. 1), with fig. 1 depicting the cathode [20] and anode [18] (i.e. two electrodes) spaced apart with the plasma [38] between said cathode [20] and anode [18] (col. 4, lines 1-6). Fig. 1 further depicts an AC source [82] powering a plasma discharge, with said AC source [82] connected to a rectifier [80], with fig. 6 depicting said rectifier [80] connected to a converter circuit [94]. Fig. 6 depicts a bridge circuit [81], [83], [95]-[98], controlled via a current control [13], connected to an output of converter circuit [94]. Manley discusses the pulses given to the cathode and anode as being at a frequency in the range of about 20 kHz to about 80 kHz (col. 12, lines 3-7). Fig. 1 also depicts a transformer [100] leading to the bridge circuit [81], [83], [95]-[98] with said transformer [100] having a primary winding [49] and a secondary winding [101], where said secondary winding [101] has two connections to bridge circuit [81], [83], [95]-[98] where said bridge circuit [81], [83], [95]-[98] is connected to polarity reversing circuit [64] which has a potential-free generator output (i.e. +/- signs), which is depicted in fig. 8 as being connected to the cathode [20] and anode [18]. Manley further discloses the polarity reversing circuit [64] periodically reverses a polarity on the sputter

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deposition apparatus (abstract), where fig. 5 depicts the polarity reversal signals as pulsed. However Manley is limited in that only one target (i.e. deposition electrode) is disclosed as comprising the two spaced apart electrodes.

Latz et al teaches coating a substrate with aluminum oxide, in addition to SiO<sub>2</sub> and titanium, via reactive sputtering using a DC source (abstract; col. 2, lines 23-28; col. 4, lines 10-14). Latz et al further teaches in fig. 1 a reactive sputtering system having an ovally shaped target (i.e. first deposition electrode) [3] and a second target (i.e. second deposition electrode) [33] mounted on a centrally disposed insulator (col. 2, lines 50-52).

Since Latz et al and Manley teach an apparatus for the reactive sputtering of aluminum oxide, it would have been obvious to one of ordinary skill in the art to incorporate the second sputtering target taught by Latz et al for the apparatus of Manley to achieve the predictable result of sputter depositing an aluminum oxide coating onto a substrate.

With respect to claims 2-3, modified Manley further discloses an output voltage of the rectifier [80], and therefore the input of the converter circuit [94], as in the range of 100 volts to 1000 volts and a power in the range of 1 kw to 15 kw (col. 13, lines 34-39). Modified Manley also specifies that the bridge circuit [81], [83], [95]-[98] are rated at 500 volts and 71 amps (col. 13, lines 56-60). Modified Manley also discusses an inductance value of 0.3 mH (col. 13, lines 29-42). However modified Manley is limited in that a specific output voltage and current for the converter circuit [94] is not provided. It is either inherent or obvious to use a voltage and/or current with a voltage transformation

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ratio no greater 1:2, as evidenced by Melnychuk et al (US Patent No. 6,815,700; abstract; col. 22, lines 50-57).

With respect to claims 4-5 and 7-8, modified Manley further discloses a modulated output signal [66] produced via a rectifier [80] and converter circuit [94] (col. 13, lines 6-9), where said modulated output signal [66] has a turn-on and turn-off parameter, with said turn-on and turn-off parameter having a range of 5 microseconds to 200 microseconds and the entire duration of a pulse is in the range of 0.5 milliseconds to 10 milliseconds (col. 5, lines 42-59). Fig. 5 depicts the modulated output signal [66] as a bipolar pulse. Fig. 6 further depicts a circuit node [81] of the bridge circuit [81], [83], [95]-[98] which can short circuit the primary winding [49] via switching [95] and switching [96].

With respect to claim 6, modified Manley further discloses in fig. 6 a current control [13] and a pulse generator [109] for the bridge circuit [81], [83], [95]-[98].

With respect to claim 9-12, modified Manley further discloses in fig. 6 also depicts a diode bridge [102]-[105] succeeding the converter circuit [94], with said converter circuit [94] being a phase shift converter (col. 12, lines 48-51). Since modified Manley depicts in fig. 6 multiple bridge circuits [81], [83], [95]-[98] and [102]-[105], it is obvious that one of ordinary skill in the art to use four bridges with each bridge having a similar design to either the first bridge circuit [81], [83], [95]-[98] and/or the second bridge [102]-[105].

With respect to claims 15-19, modified Manley further discloses sputter deposition using reactive sputtering for depositing  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{Si}_3\text{N}_4$ , and  $\text{TiO}$  (i.e.

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dielectric materials) (abstract; col. 1, lines 51-62). Modified Manley also discloses using various reactive gases such as oxygen, nitrogen, and hydrogen sulfide (col. 8, lines 49-51).

With respect to claim 20, modified Manley further discloses reactively depositing aluminum oxide (col. 1, lines 51-62), with it being either inherent or obvious for aluminum to have alpha- and gamma-phases.

### ***Response to Arguments***

#### ***Miscellaneous***

5. On p. 7, the Applicant states that the references cited in the above rejection were included in the specification of the present application, However no Information Disclosure Statement has been filed. The Applicant must file an IDS for the references in the specification in order for the references to be properly considered by the Examiner.

#### ***102 and 103 Rejections***

6. On p. 7-8, the Applicant argues that Manley and Latz et al teach different principles and cannot be compared nor combined.

The Examiner respectfully disagrees. Both references teach a reactive sputtering deposition of identical materials from a single target via a DC power source. Latz et al is combined with Manley to show that the single target/electrode of Manley is modified to incorporate the single target having two deposition electrodes of Latz et al.

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7. Applicant's arguments, see p. 6-15, filed 10/28/2008, with respect to the rejection(s) of claim(s) 1-13 and 15-20 under 102(b) and claim 14 under 103(a) have been fully considered and are persuasive due to Manley not teaching two deposition electrodes. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Manley (US Patent No. 5,993,613) and Latz et al (US Patent No. 5,026,471).

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 8am-4pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a



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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795